



Podmaniczky's favorite sharpening setup is the Multi-Stone (rear), a set of three stones mounted so they can revolve through an oil bath to keep them clean. His boxed stones, bought 15 years ago, are a medium-grit India (right) and a hard black Arkansas.

Sharpening With Oilstones

Nojigs, no gadgets, no nonsense

by Michael S. Podmaniczky

There are legions of would-be woodworkers who think that the edge that their new chisel arrives with is forever. I know because I've met some of them. But charity and understanding are needed rather than contempt; after all, I hate to think what I will do the first time I have a masons' trowel in hand, or at which end of the cobblers' bench I would sit down. No, this sort of thing is not at all inherent and must be learned like everything else.

In fact, without a good grounding in sharpening procedures, nothing else that follows can be properly done, and that includes, well, everything. I hate to think how many beautiful projects have been discouraged because the tools just didn't perform as expected. Sharpening is so important that it must eventually become second nature to the wood craftsman. We will discuss the various steps necessary to take a chisel or plane iron from dull to sharp: establishing the bevel on the bench grinder and sharpening on the various stones, from coarse to fine. While this is a step-by-step procedure, I hope that in due time those steps will blend together in your subconscious so that there will be no more thinking, only doing.

Before doing, however, must come knowing. What exactly does "sharp" mean? We know the ideal, a perfect wedge of steel, tapering down to microscopic nothingness. Unfortunately, whether in foreign policy or tool handling, ideals are easier to imagine than to attain. When steel is pushed across even the finest stone, bits of metal are worn away and microscopic serrations are formed on the edge—these correspond in dimension to the grit of the stone. What we try to do is minimize the size of the serrations and maximize their regularity.

Most edge tools are pushed through the wood, and consequently require the finest serrations so as not to drag on the wood fibers. For this, a progression of stones is used, ending with the finest grit possible. A knife, drawknife, or other tool that is used in a slicing motion, such as (forgive me) a steak knife, works best with slightly greater, but still regular serrations on the edge. In this case, the progression through stone grits can stop short of the finest. Our task is to be able to consistently produce the edge we need for the best woodwork possible.

As I have said, this should be second nature, so I'm afraid that that means out with all the paraphernalia pushed by the tool

catalogs to "help" with sharpening—jigs, holders, rollers, etc. You are perfectly capable of doing without all of that. There are, however, a few things you can't do without, such as benchstones, so let's discuss them first.

I don't much care for Japanese waterstones. One reason is that waterstones wear hollow much faster than the harder oilstones and must be regularly dressed in order to keep them flat.

I use oilstones, and feel that the best way to go, if you can afford it, is the Norton Multi-Stone. It holds a medium Crystolon stone, which you will use about once a year, a fine India, and a hard, black Arkansas (pronounced *arkanzas*), both of which you will use almost every time you sharpen. These three stones are mounted on a shaft so they can be revolved through an oil bath to keep them clean.

Like the grinding wheel, benchstones are made up of many sharp micro particles, bonded together in such a way that they cut steel until they are dull, and then wear away from the stone. Man-made Crystolon, a Norton trademark, is "soft," with large (relatively), loosely bonded particles; it cuts rapidly and wears down just as quickly. It's really only useful if you don't have a bench grinder and have to remove a lot of meat by hand. India (also a Norton trademark) is a bit finer grit and stronger bond (i.e. harder); it's the best all-around stone, well-made and well-wearing. Natural Arkansas stones can be purchased from coarse/soft to fine/hard, but with high-quality man-made stones available for most of the range, I stick with the top of the line—hard and black. These are the stones that surgeons sharpen scalpels with.

If you can't go the Multi-cost (about \$175, from Woodcraft Supply, Box 4000, Woburn, Mass. 01888), buy the Norton combination stone (Crystolon on one side, fine India on the other),

and a separate, hard black Arkansas. Spend some money for a change: buy a bit of really nice exotic wood and make a couple of nice hinged-top boxes for the pair of them. This will keep them clean and give you the pride and confidence necessary to keep up a well-sharpened set of tools.

This brings me to another reason why I don't like waterstones. They are said to cut faster than the oilstones that we of Western tradition are used to, but this is a bit misleading. For one thing, the Japanese grit-numbering system is very different from the American. For example, a 1200-grit Japanese stone is roughly the equivalent of a 550-grit oilstone (about the grit of a soft Arkansas stone), and a 6000-grit Japanese stone is about the same as a hard Arkansas stone (our 800- to 1000-grit). If you compare the speed of cut between a 1000-grit Arkansas stone and a 6000-grit Japanese stone, you'll find that they are about the same and that they give an equivalent finish to the steel.

The other thing that affects cutting speed is the fluid used to keep the stone clean. A stone should be flooded with an appropriate liquid during sharpening in order to float particles of steel and stone away and prevent the abrasive from clogging up. Natural Arkansas, and most man-made stones, require the use of oil, other man-made stones require water. The problem is the common understanding of what is meant by "oil." I have actually heard responsible people say that the oil is used to *lubricate* the stone, so they use heavy, viscous oil (sometimes even marketed as "honing" oil) and it does indeed lubricate. Unfortunately that is the last thing one wants. We want friction, we want to abrade, so it's no wonder that waterstones seem to cut faster; there's less lubrication with waterstones, mostly abrasion.

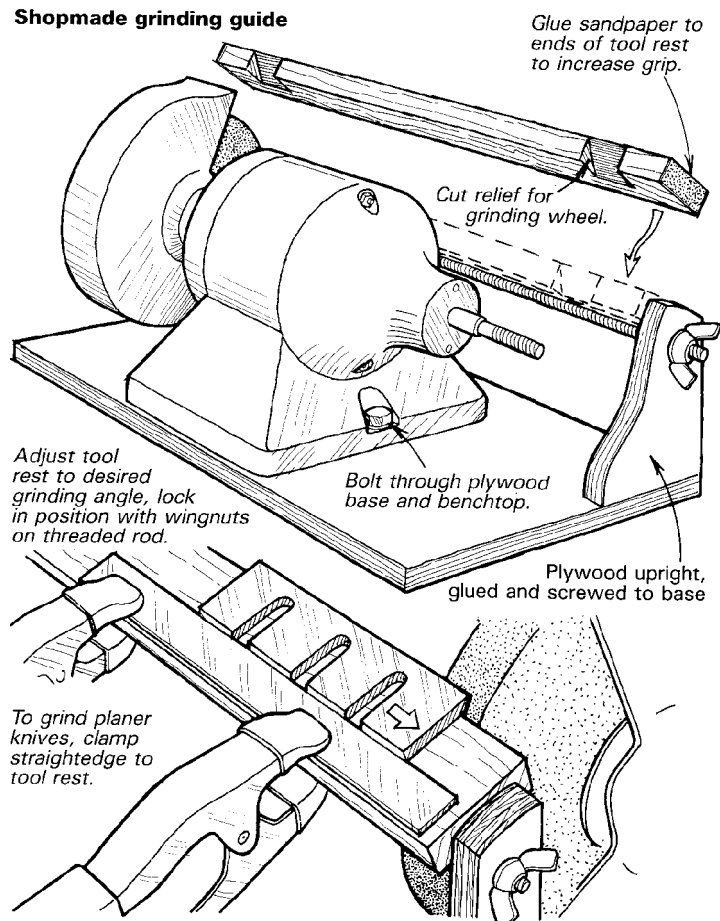
I use a very light oil. Kerosene and fuel oil are about right, but I discovered a few years back that WD-40 not only has a good viscosity, it also doesn't smell bad on my hands. Unlike the use of water, residue on the tool inhibits, rather than promotes, rust. Buy WD-40 in the half-gallon jug and use it for everything except salad dressing. For your kitchen stone, try a little liquid dishwashing soap as a lubricant, or better still, Norton's honing oil, which is a highly refined mineral oil and safe to use around food.

The other stone you should be concerned about is the wheel on your grinder. There are volumes written on abrasive wheels, and in fact there's an article about them in this issue. The different types of stones do different jobs and produce different finished surfaces, but since I put the important, finished edge on with benchstones, I just use what works for me, the white aluminum-oxide wheels sold by Woodcraft Supply. They wear down faster than gray wheels, but have less tendency to burn.

Given the lack of extended operation any of us will ever ask of our grinder, it's not necessary to go overboard buying one. Just be sure that it's well-anchored to your sharpening bench, and that there is plenty of room around it. I discard the tiny tool rests that are usually supplied with grinders and fabricate my own. The drawing at left shows my setup, which is versatile yet easy to make. It's merely a loose wooden rest held in position between two uprights by wingnuts and threaded rod. As shown in the detail, the tool rest can be used for sharpening jointer and planer knives. I clamp a metal ruler to the rest and run the knife along it. For fine adjustment, you can simply pivot one end of the ruler; it doesn't have to be exactly parallel to the face of the wheel.

Putting tool to stone—A plane iron is ground at approximately 25°, but a free-handed tool, such as a chisel, can be ground to a range of angles depending on the circumstances. A very fine angle, say 20°, will cut very nicely, but unfortunately will also break

Shopmade grinding guide



The other side of the edge

by Jim Cummins

All the time in the world spent sharpening a bevel won't give you a sharp tool if the back of the edge is scratched, rusty or pitted. These imperfections cut into the edge from the back side. Just as a nicked jointer knife leaves its trail on the work, so does a chisel with a dull back.

Sharpening a bevel takes but a few seconds, for there is very little metal to be removed. Flattening and sharpening a back, however, is a long job. Here are a couple of extensions to the basic sharpening stones, which I learned of several years ago from Robert Meadow, of West Saugerties, N.Y., that can help bring your chisels to their full potential.

The first is a diamond plate, made by Eze-Lap, P.O. Box 2229, Westminster, Calif. 92683. The main virtues of the plate, which sells for about \$55, are that the entire surface is covered with diamonds and that the plate is dead flat, which provides a reference surface—when the scratch pattern is even across the width of the chisel, then the chisel itself is flat.

You *could stop* right here. The flat back, by itself, will make your chisel a superior tool. You'll be able to pare with it flat, the edge will be straight, and the corners will be sharper than ever before. But you can still improve things.

Move to your coarse stone and make a few passes to see the new, finer, scratch pattern superimposed over the old. Use each stone in the series to remove the previous stone's scratches.

After the Arkansas stone, the final step is to buff the chisel back by pulling it across a hardwood block coated with rottenstone, a fine abrasive available in paint and hardware stores. To make the block, mix rottenstone with water and apply it as a thick paste. When the paste has dried, use the block as a strop, working away from the chisel edge, not into it, on both back and bevel. The photo at right shows the results, and I only wish chisels came like this in the first place.

The photos also show a new diamond-sharpening system developed by Robert Sorby in England. It consists of a flat ceramic tile and an aerosol can of diamond particles in a lubricating fluid. You spray diamond on the tile, then use it much like a regular sharpening stone.

There are three grits—medium, fine and super-fine—covering the range that compares with oilstones from coarse up to about fine India. At least, that's the way the cutting speed and polish seem to me. Each grit and its accompanying tile costs \$53.50 (from Garrett Wade, 161 Ave. of the Americas, New York, N.Y. 10013).

Initial tests showed that it flattened chisel backs faster than anything. Further test-



The strong point of Robert Sorby's aerosol diamond slurry is the flatness it gives to the backs of chisels and plane irons. The diamond can also sharpen carbide router bits.



To extend the range of the typical sharpening stones, you can use a diamond plate for initial flattening, and a wooden block coated with rottenstone for final polishing. Mirror-like results are shown at right.



ing by woodworker Frank Klausz and his five-man crew in Pluckemin, N.J., suggested that the system wasn't at its best in all-around shop sharpening work. The slurry becomes black with metal particles almost instantly, requiring a woodworker to wash up before continuing work. The same metal particles quickly clog the lubricating fluid and slow the cutting action, tempting the user to spray another shot of expensive diamond on the tile. When Klausz ran out of spray, he figured the cost at \$1 per tool, and was so unimpressed that he asked me to check with Sorby for their side of the story.

Sorby's technical spokesman, Tony Walker, said we had somewhat missed the point. After the first few sprayings, the tile should be used dry, until the diamond re-

maining on it ceases to cut. This cutting action may be slower than with fresh, wet diamond, but it will still do the job at a reasonable pace. The advantages of the tile are that it stays flat, like the diamond plate mentioned above, and that it can be used to sharpen high-speed steel tools with just a few light strokes. (High-speed tools, popular with woodturners, are notoriously difficult to sharpen with the softer abrasives found in regular honing stones). Also, Walker went on, the tile can be used to hone the flat faces of a carbide router bit. A couple of strokes each time you use the bit will keep it like new. □

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down most quickly. A blunter instrument, say 40°, won't break down as fast, but requires more muscle to drive into the work ("Hand me the commander!"). This all works out in practice, since the lovely carving and parting tools you use on fine work are hard enough to take a fine edge, and you would seldom put a mallet to them. Your mortise chisels or drawknife, at the other end of the spectrum, are made from softer, tougher steel, and therefore need a blunter edge, which in turn stands up longer to the abuse you'll deliver when using them.

As a matter of fact, those tools at the rough-and-tumble end of the tool kit—hatchets, axes, some drawknives, some adzes—can often be sharpened with a file to a slightly rounded, blunter edge, giving that edge longer life.

Adjust the tool rest on the grinder to the desired angle and begin removing steel, passing the blade back and forth across the face of the stone, keeping the forefinger of your holding hand tucked underneath and riding against the edge of the tool rest. This regulates constant but light pressure on the stone, which will hollow grind the tool bevel—producing in profile a concave bevel the same radius as the wheel—and removing steel much faster than you would be able to on the handstones. Light but firm—don't press down or hold the tool in one spot, or you'll burn the edge and ruin your day.

When you feel the tool heating up, remove it from the wheel and hold it in the draft of the grinder until it cools down. A lot of people cool the tool by clipping it in water from time to time as grinding proceeds, but I was once told by a blacksmith that such

treatment, if repeated often enough, can subtly affect the steel. I have quenched with water many times when I was in a hurry, but I don't feel comfortable with the practice.

Remember, if you blue the steel, the edge is shot, so you might as well start over. Don't try just lapping the blue surface oxidation off on a whetstone—it's a waste of time, because the steel underneath is still burned and softened. Set the angle of the tool rest to 90° and grind the tool edge blunt, square to the face of the wheel, until you are past the burned material (or the chip you took out of it when you dropped it on the cement, or hit that nail that wasn't there. . .). Reset the rest to the angle you are working on and resume grinding the bevel.

Never grind to a featheredge—It's almost impossible not to burn the steel if you allow it to get too thin; the heat just has nowhere to dissipate. As you grind, stop every so often to look at the bevel. The area that's cleanly ground will slowly increase as the area along the edge that had been previously hand stoned decreases. When your grinding is about a shy ¼ in. from the edge (or just touching the blunted edge you put on in the last paragraph) stop and move to the benchstones to finish removing metal right out to the edge.

Slosh the fine India with oil, or if you're using a Multi-Stone, give it a turn through the oil bath, and you're ready to go.

The next step is the dealer's choice: grip your tool. I'm afraid that there's no "one way" to do it. At one extreme is Ian Kirby's interlocking-fingers golf grip (which I have never been able to master), and at the other extreme is the three-fingered-with-one-hand-in-your-pocket grip (which I have always liked in a very cold boatshop). Any way that works is the right way. Try holding the plane iron or chisel with the right hand, leaving enough room to place one or two fingers of the left hand on the back of the blade near the edge to distribute the pressure evenly.

The object of this is to be able to set your blade to the stone at the desired angle, and hold that angle throughout the sharpening process, so as not to rock the tool and round the bevel. You'll practice with clenched teeth and white knuckles for what will seem like ages, and one day you'll realize that you can't remember when you last thought about it. . .you'll be there.

Here's another plus for hollow grinding: Laying the bevel flat on the stone has a solid feel when both the edge and the heel of the bevel are in contact with the surface. Ever so slightly rock the heel off the stone, so that just the edge is in contact. . .and hold it! If you draw the tool back across the stone in this position, scraping oil away, you can then rock back and forth, heel to edge, and watch the little wake of oil form at the edge when the bevel is flat, and then flow away when the heel is picked up. All these little tricks can help you get used to the feel of the tool on the stone.

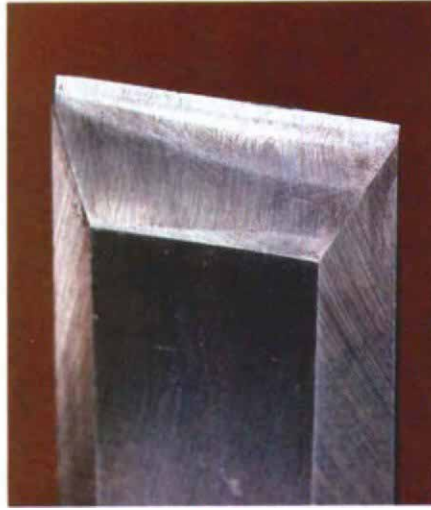
When you feel that you have a comfy grip, and can hold the angle, start moving the tool around the surface of the stone. Keep constant pressure on the edge with whatever fingers you have up there. A good rule of thumb is: keep the tool off the center of the stone. The natural impulse is to wear away in the middle, scrubbing away stone until there's a shallow dish instead of a nice, flat surface. This is a constant battle when you use waterstones, but even harder oilstones need to be dressed flat once in a very great while. To dress a stone, you can use coarse valve-grinding compound (from an auto supply store) spread on a sheet of plate glass. A few minutes spent rubbing the stone on the glass will flatten even a badly dished surface. Another way is to wet a sheet of coarse wet-and-dry sandpaper and lay this flat on a piece of plate glass (the water should hold it in place; if not,



As a guide, Podmaniczky runs his forefinger along the front of his shopmade tool rest (see figure 1). Next, working at the ends of the stone, he hones the chisel with a circular motion, about as fast as you'd stir a cup of coffee. The grip maintains a steady angle and balanced pressure directly on the cutting edge.



The hollow-ground bevel, directly from the grinding wheel. The old edge has been squared off on the wheel, and the grind stops just behind the flat spot, in order not to burn the steel.



As the edge is honed sharp, the excess metal may come off as a 'wire edge.' This chisel has been deliberately honed with more pressure on one corner than the other to demonstrate the wire.



It's a waste of effort to hone the entire bevel. After four or five more honings, the polished area at the cutting edge will become wide enough that it will be worthwhile to regrind the bevel.

you can tape it down before wetting). But this chore shouldn't be necessary very often, provided that you don't provoke the condition; my hard Arkansas has stayed flat for more than 15 years. "Stay in the corners and the middle will take care of itself," the old guy used to say, and he was right.

Stone the tool at whatever pace feels comfortable. I've seen even experienced woodworkers stone tools in a series of separate, measured straight strokes, stopping often to gaze at the developing edge. . . like they were grooming their Karma or something. But I got away from that a long time ago (by the time they're on their third stroke, I'm finished). I sharpen in small circles at the ends, or the corners if the tool is small, moving occasionally from one end to the other, working at about the speed I would stir a cup of coffee. Staying in one small area helps me keep that angle without rocking. I'll finish up with a few brisk forward and back strokes the length of the stone in order to align those serrations as regularly as possible.

As the metal wears away, the edge eventually becomes so thin that it can no longer support itself and begins to bend back and away; this is what's called the burr. When you feel it forming across the whole back of the edge, flip the tool over and hold it flat on its back, moving it about the stone until the burr is no longer felt on the back, but on the bevel side of the edge. Repeat both steps and the burr is almost ready to come off as a "wire edge." Draw the tool edge backward across a clean piece of leather, or your palm, first on one side and then the other, or work the burr back and forth with your thumb (carefully) until the wire edge comes off. During the process of forming the burr, it's imperative that the back of the tool is kept perfectly flat on the stone, since any rocking and consequent rounding of the back eliminates the jiggling action that a straight edge gives when in use. Try paring with a cheap chisel that has been belt sanded to shape and you'll soon see what I mean.

After the burr has come off, a tool that's going to be used primarily in a slicing manner may be ready for use. Try it and see if it does what you want.

If you need a finer edge, move to the hard Arkansas, and repeat the same operation, only this time rock the tool up a degree or so, so that you are sure you are working right at the edge. You

will see a very fine, but unmistakable, polished line developing out at the business end of the tool. You will probably not bring up much of a burr on the hard stone, but if you do, and are able to work a wire off the edge, give the edge one or two extra passes along the stone in order to straighten out those micro-serrations. Trying to put what amounts to a polish on the whole bevel is time-consuming and unnecessary; after all, it's only the edge that's doing the cutting. A hard Arkansas doesn't take away much material per minute spent working on it, so don't beat yourself to death if you don't have to.

If you're new at this, and if you've been careful to follow the procedure, I can safely say that your tool is sharp, or at least that you'll be pleased with the results. There are a few esoteric ways of "testing" the sharpness you have achieved: Try shaving some hair from your arm *carefully*, lightly draw the edge in a slicing motion across the back of your thumbnail in order to feel if there are any invisible nicks; stand the blade on your thumbnail and see how far you can lower it down before it begins to slide across the surface of the nail; *look* at it. Except for looking, I don't do any of these things under normal circumstances, since, as I said, if everything was done right, the edge is sharp. If for some reason I'm not happy with the way the tool performs, I go back to the stones and freshen it up.

Work away until you notice that there has been backsliding by the tool to its old pre-sharpened tricks—there may be ridges developing on the wood due to tiny nicks or breaks in the edge; the cut surface is no longer clean and crisp—you'll know. For resharpening, stay with the benchstones until you have flattened out most of the hollow grinding on the bevel, or you've begun to round the bevel, or it's taking too long to bring back an edge. In order to bring up the burr, you'll find that you are ever so slowly increasing the angle to the stone with each subsequent sharpening, and it will eventually be necessary to grind again, establishing the hollow and proper bevel once more. You should be able to sharpen a chisel or plane iron in a minute or two, and get about four or five sharpenings per grinding. □

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